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<120> Pituitary Adenylate Cyclase Activating Peptide (PACAP) Receptor 3 (R3) Agonists and Their Pharmacological Methods of Use

<130> Bayer

<150> 09/407,832
<151> 1999-09-28

<150> 09/595,280
<151> 2000-06-15

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Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly Pro Ser
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Ser Gly Ala Pro Pro Pro Ser
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Leu Lys Lys
            20                  25


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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Lys Gly Gly Thr
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gly Gly Thr
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys
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Met Ala Val Lys Lys Tyr Leu Asn Asp Leu Lys Lys Gly Gly Thr
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Leu Lys Lys Gly Gly Thr Ser
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Met Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gly Gly Thr
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Leu Ala Val Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gly Gly Thr
             20   25   30

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Leu Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Lys Gly Gly Thr
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            20   25   30

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Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Lys Gly Gly Thr
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1   5   10   15

Leu Ala Val Lys Lys Tyr Leu Asn Asp Ile Lys Asn Gly Gly Thr
            20   25   30

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Leu Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Gly Gly Thr
            20   25   30

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1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gly Gly
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1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gly
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys
            20   25

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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Gln
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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Asn Gln
            20   25   30

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Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Lys Lys Lys Arg Tyr
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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Lys
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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Leu Lys
            20   25

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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Leu Asn
            20   25

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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Leu Asn
            20   25

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Leu Ala Val Lys Lys Tyr Leu Asn Ser Ile Leu Asn
            20   25

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Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Leu Asn
            20   25

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Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn
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            20   25

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            20   25   30

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            20   25

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                20                  25                  30


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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Lys Lys Arg Tyr
                20                  25                  30


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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Lys Lys
              20   25

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Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
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                20                  25


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1               5                   10                  15


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                20                  25


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gag   123

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<400> 57

His Ser Asp Gly Ile Phe Thr Glu Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Leu Lys Lys Lys Arg Tyr Lys
                20   25   30

Gln Arg Val Lys Asn Lys
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<400>   58

His Ser Asp Ala Val Phe Thr Glu Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Asn Ser Leu Lys Lys
            20   25

<210>   59
<211>   31
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<223>   AMIDATION

<400>   59

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ser Ala Val Arg His Gly Gly Thr
            20   25   30

<210>   60
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<400>   60

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln

1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Lys Gln Gly Gly Thr
                    20   25   30

<210> 61
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<223> AMIDATION

<400> 61

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Lys Lys Tyr Leu Ala Ala
                    20   25   30

Val Arg His Gly
          35

<210> 62
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<400> 62

Ser Trp Cys Glu Pro Gly Trp Cys Arg His Ser Asp Ala Val Phe Thr
1   5   10   15

Glu Asn Tyr Thr Lys Leu Arg Lys Gln Leu Ala Ala Lys Lys Tyr Leu
                    20   25   30

Asn Asp Leu Lys Lys Gly Gly Thr
          35   40

<210> 63

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<400>  63
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Leu Lys Gly Gly Thr
            20   25   30

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<400>  64
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Asp Ile Leu Asn Gly Gly Thr
            20   25   30

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<400>  65
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Val Lys Lys Tyr Leu Asn Asp Ile Leu Lys Gly Gly Thr
          20   25   30

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<400> 66

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Ala Asp Val Lys Lys Gly Gly Thr
          20   25   30

<210> 67
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<400> 67

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Ala Asp Val Lys Lys
          20   25

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<400> 68

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Leu Ala Val Lys Lys Tyr Leu Ala Ala Val Lys Lys
                20   25

<210> 69
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<400> 69

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Lys Lys
                20   25

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<400> 70

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Lys
                20   25

<210> 71
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<400>   71

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20   25   30

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<400>   72

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

<210>   73
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<400>   73

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Thr Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 74

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 75

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 76

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Thr Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 77

His Ser Asp Ala Val Phe Thr Asp Gln Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 78

His Ser Asp Ala Val Phe Thr Asp Gln Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys Lys Tyr Leu Asn Thr Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 79

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala His Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 80

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys His Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 81

His Ser Asp Ala Val Phe Thr Asp Gln Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala His Lys Tyr Leu Asn Thr Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 82

His Ser Asp Ala Val Phe Thr Asp Gln Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Leu Ala Ala Lys His Tyr Leu Asn Thr Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 83

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Lys Lys Arg
            20   25   30

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<400> 84

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Lys Lys Arg
            20   25   30

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<400> 85

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 86

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Lys Lys Lys Arg
            20   25   30

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<400> 87

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln

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1               5            10                15
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Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Lys Lys Lys
            20   25

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<400> 88

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys Arg Tyr
            20   25   30

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<400> 89

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys Arg Tyr
            20   25   30

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<400> 90

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys Arg
            20              25                  30


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<400> 91

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys
            20              25


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<400> 92

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys
            20              25


<210> 93
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<400>  93

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys Arg Tyr
            20                  25                  30

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<400>  94

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys Arg
            20                  25                  30

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<400>  95

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Leu Lys Lys
            20                  25

<210> 96
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<400> 96

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Val Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys
            20                  25


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<400> 97

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Asn Lys Arg Tyr
            20                  25                  30


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<400> 98

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Asn Lys Arg

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<400>  99

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Leu Asn Lys
            20                  25

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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Cys Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30

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<400>  101

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Asp Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


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<400> 102

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Glu Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


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<400> 103

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Phe Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


<210> 104
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<400>    104

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Gly Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210>    105
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<400>    105

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala His Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210>    106
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<400>    106

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Ile Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210>    107
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<400>   107

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Lys Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20   25   30

<210>   108
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Leu Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20   25   30

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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15
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Met Ala Met Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
          20              25              30


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<400> 110

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5               10              15


Met Ala Asn Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
          20              25              30


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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5               10              15


Met Ala Pro Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
          20              25              30


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<400> 112

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Gln Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


<210> 113
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<400> 113

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Arg Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


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<400> 114

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Ser Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20              25                  30


<210> 115
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Thr Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210> 116
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<400> 116

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Val Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210> 117
<211> 30
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<223>

<400> 117

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Trp Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210> 118

<211> 30
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<223>

<400> 118

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Tyr Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Arg
            20                  25                  30


<210> 119
<211> 30
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<223>

<400> 119

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Ala Asn Lys Arg
            20                  25                  30


<210> 120
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<400> 120

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15

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Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Cys Asn Lys Arg
            20              25              30
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<400>  121
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```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                  10              15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Asp Asn Lys Arg
            20              25              30
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<210>  122
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<223>

<400>  122
```

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                  10              15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Glu Asn Lys Arg
            20              25              30
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<222>  (1)..(30)
<223>
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<400> 123

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Phe Asn Lys Arg
            20   25   30

<210> 124
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<220>
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<222> (1)..(30)
<223>

<400> 124

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Gly Asn Lys Arg
            20   25   30

<210> 125
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<220>
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<223>

<400> 125

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile His Asn Lys Arg
            20   25   30

<210> 126
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<212> PRT
<213> Artificial Sequence

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<223>

<400> 126

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Ile Asn Lys Arg
            20   25   30

<210> 127
<211> 30
<212> PRT
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<223>

<400> 127

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Met Asn Lys Arg
            20   25   30

<210> 128
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<223>

<400> 128

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Asn Asn Lys Arg
            20   25   30

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<400>   129
```

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Pro Asn Lys Arg
            20   25   30


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<210>   130
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<222>   (1)..(30)
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<400>   130
```

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Gln Asn Lys Arg
            20   25   30


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<400>   131
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Arg Asn Lys Arg
            20   25   30

<210> 132
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<223>

<400> 132

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Ser Asn Lys Arg
            20   25   30

<210> 133
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<400> 133

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Thr Asn Lys Arg
            20   25   30

<210> 134
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<223>

<400>   134

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Val Asn Lys Arg
            20   25   30

<210>   135
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<400>   135

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Trp Asn Lys Arg
            20   25   30

<210>   136
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<223>

<400>   136

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Tyr Asn Lys Arg
            20   25   30

<210>   137
<211>   30
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<223>

<400>   137
```

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Ala Arg
            20   25   30


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<210>   138
<211>   30
<212>   PRT
<213>   Artificial Sequence

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<222>   (1)..(30)
<223>

<400>   138
```

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Cys Arg
            20   25   30


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<213>   Artificial Sequence

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<222>   (1)..(30)
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<400>   139
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Asp Arg
            20   25   30

<210> 140
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<222> (1)..(30)
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<400> 140

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Glu Arg
            20   25   30

<210> 141
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<223>

<400> 141

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Phe Arg
            20   25   30

<210> 142
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<223>

<400> 142

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln

```
1               5               10              15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Gly Arg
              20              25              30
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<210> 143
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<223>

<400> 143

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5               10              15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn His Arg
              20              25              30
```

<210> 144
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<400> 144

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5               10              15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Ile Arg
              20              25              30
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<210> 145
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<223>

<400> 145

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Leu Arg
            20   25   30

<210>   146
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<213>   Artificial Sequence

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<223>

<400>   146

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Met Arg
            20   25   30

<210>   147
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<223>

<400>   147

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Asn Arg
            20   25   30

<210>   148
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<223>
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<400>   148
```

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Pro Arg
            20                  25                  30
```

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<210>   149
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<222>   (1)..(30)
<223>
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```
<400>   149
```

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Gln Arg
            20                  25                  30
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<223>
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<400>   150
```

```
His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15
```

```
Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Arg Arg
            20                  25                  30
```

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<210>   151
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<220>
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<222> (1)..(30)
<223>

<400> 151

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Ser Arg
            20   25   30

<210> 152
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<223>

<400> 152

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Thr Arg
            20   25   30

<210> 153
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<400> 153

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Val Arg
            20   25   30

<210> 154
<211> 30

<212> PRT
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<222>   (1)..(30)
<223>

<400>   154

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Trp Arg
            20   25   30

<210>   155
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<223>

<400>   155

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Tyr Arg
            20   25   30

<210>   156
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<220>
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<222>   (1)..(30)
<223>

<400>   156

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Ala
          20   25   30

<210> 157
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<220>
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<222> (1)..(30)
<223>

<400> 157

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Asp
          20   25   30

<210> 158
<211> 30
<212> PRT
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<223>

<400> 158

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Glu
          20   25   30

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<400> 159

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Phe
            20   25   30

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<400> 160

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Gly
            20   25   30

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<400> 161

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys His
            20   25   30

<210> 162
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<223>

<400>   162

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15


Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Ile
            20                  25                  30


<210>   163
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<222>   (1)..(30)
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<400>   163

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15


Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Lys
            20                  25                  30


<210>   164
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<220>
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<400>   164

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1               5                   10                  15


Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Leu
            20                  25                  30


<210>   165
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<211>   30
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<400>   165
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Met
            20   25   30


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<210>   166
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<400>   166
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Asn
            20   25   30


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<210>   167
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<400>   167
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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Pro
                20   25   30

<210>   168
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<220>
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<400>   168

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Gln
                20   25   30

<210>   169
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<223>

<400>   169

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Ser
                20   25   30

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<223>

<400> 170

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Thr
            20   25   30

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<400>   171

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Val
            20   25   30

<210>   172
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<223>

<400>   172

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Trp
            20   25   30

<210>   173
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<400> 173

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Met Ala Ala Lys Lys Tyr Leu Asn Ser Ile Lys Asn Lys Tyr
            20   25   30

<210> 174
<211> 40
<212> PRT
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<220>
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<220>
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<222> (1)..(40)
<223>

<400> 174

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Asn Lys Arg Tyr Ser
            20   25   30

Trp Cys Glu Pro Gly Trp Cys Arg
            35   40

<210> 175
<211> 31
<212> PRT
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<220>
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<220>
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<222> (1)..(31)
<223>

<400> 175

His Ser Asp Ala Val Phe Thr Asp Asp Tyr Thr Arg Leu Arg Lys Glu
1   5   10   15

Val Ala Ala Lys Lys Tyr Leu Glu Ser Ile Lys Asp Lys Arg Tyr
                20   25   30

<210> 176
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 176

Glu Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
                20   25

<210> 177
<211> 27
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 177

His Lys Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
                20   25

<210> 178
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<220>
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<222> (27)..(27)

<223> AMIDATION

<400> 178

His Ser Lys Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 179
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<223> AMIDATION

<400> 179

His Ser Asp Lys Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 180
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<220>
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<400> 180

His Ser Asp Gly Lys Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 181
<211> 27

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<220>
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<222>   (27)..(27)
<223>   AMIDATION


<400>   181

His Ser Asp Gly Ile Lys Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1               5                   10                  15


Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20                  25


<210>   182
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<220>
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<223>   AMIDATION


<400>   182

His Ser Asp Gly Ile Phe Lys Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1               5                   10                  15


Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20                  25


<210>   183
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<220>
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<223>   AMIDATION


<400>   183

His Ser Asp Gly Ile Phe Thr Lys Ser Tyr Ser Arg Tyr Arg Lys Gln
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1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 184
<211> 27
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 184

His Ser Asp Gly Ile Phe Thr Asp Lys Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 185
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<220>
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<223> AMIDATION

<400> 185

His Ser Asp Gly Ile Phe Thr Asp Ser Lys Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 186
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<220>
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<223> AMIDATION

<400> 186

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Lys Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 187
<211> 27
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 187

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Glu Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 188
<211> 27
<212> PRT
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<220>
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 188

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Lys Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

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<210>   189
<211>   27
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<220>
<221>   MOD_RES
<222>   (27)..(27)
<223>   AMIDATION


<400>   189

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Glu Lys Gln
1               5                   10                  15


Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20                  25


<210>   190
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<212>   PRT
<213>   Artificial Sequence

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<220>
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<223>   AMIDATION


<400>   190

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Glu Gln
1               5                   10                  15


Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20                  25


<210>   191
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<220>
<221>   MOD_RES
<222>   (27)..(27)
<223>   AMIDATION
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<400> 191

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Lys
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 192
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<223> AMIDATION

<400> 192

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Lys Ala Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 193
<211> 27
<212> PRT
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 193

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Lys Val Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 194
<211> 27
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 194

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Lys Lys Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 195
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 195

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Glu Lys Tyr Leu Ala Ala Val Leu
            20   25

<210> 196
<211> 27
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<223> AMIDATION

<400> 196

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Glu Tyr Leu Ala Ala Val Leu
            20   25

<210> 197
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<223> AMIDATION

<400> 197

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Lys Leu Ala Ala Val Leu
            20   25

<210> 198
<211> 27
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<213> Artificial Sequence

<220>
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<220>
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<223> AMIDATION

<400> 198

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Lys Ala Ala Val Leu
            20   25

<210> 199
<211> 27
<212> PRT
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<223> AMIDATION

<400> 199

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Lys Ala Val Leu
            20   25

<210> 200
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<212> PRT
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<220>
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<220>
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<222> (27)..(27)
<223> AMIDATION

<400> 200

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Lys Val Leu
            20   25

<210> 201
<211> 27
<212> PRT
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<220>
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<223> AMIDATION

<400> 201

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1   5   10   15

Met Ala Val Lys Lys Tyr Leu Ala Ala Lys Leu
            20   25

<210> 202
<211> 27

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<212>  PRT
<213>  Artificial Sequence

<220>
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<220>
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<222>  (27)..(27)
<223>  AMIDATION


<400>  202

His Ser Asp Gly Ile Phe Thr Asp Ser Tyr Ser Arg Tyr Arg Lys Gln
1               5                   10                  15


Met Ala Val Lys Lys Tyr Leu Ala Ala Val Lys
            20              25


<210>  203
<211>  111
<212>  DNA
<213>  Artificial Sequence

<220>
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<222>  (1)..(111)
<223>

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<210>  204
<211>  123
<212>  DNA
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<220>
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<220>
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<222>  (1)..(123)
<223>

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gag                                                                   123


<210>  205
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<211>   123
<212>   DNA
<213>   Artificial Sequence

<220>
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<220>
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<222>   (1)..(123)
<223>

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aaacagctgg ctgctaagaa atacctgaac gacatcaaga aaggtggcac ctaatgactc   120

gag   123

<210>   206
<211>   109
<212>   DNA
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<220>
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<222>   (1)..(109)
<223>

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<210>   207
<211>   114
<212>   DNA
<213>   Artificial Sequence

<220>
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<220>
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<222>   (1)..(114)
<223>

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aaacagatgg ctgttaagaa atacctgaat tccatcaaga aataatgact cgag   114

<210>   208
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<212>   DNA
<213>   Artificial Sequence

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<223>

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aaacagatgg ctgttaagaa atacctgaat tccatcaaga actaatgact cgag           114


<210>  209
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<212>  DNA
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aaacagatgg ctgttaagaa atacctgaat tccatcctga ataatgact cgag            114


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<210>  211
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<210> 212
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<210> 213
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<210>  218
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gag                                                                 123


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gag                                                                  123


<210>  222
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gag                                                                  123


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<210>  224
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gag                                                                   123


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aaacaggttg ctgcaaagaa atacctgcag tccatcaaga ataatgact cgag           114


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            20   25   30

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            20   25   30

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His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln
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Met Ala Ser Lys Lys Tyr Leu Asn Ser Ile Gln Asn Arg Ile
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Cys Arg Lys Gln Val Ala Ala Lys Lys Tyr Leu Gln Ser Ile Lys Asn
1   5   10   15

Lys Arg Tyr

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Ser Trp Cys Glu Pro Gly Trp Cys Arg
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